

The throughput editor window 710 provides a mechanism to amend process and usage quantities as well as factors. This information is presented in a manner consistent with the line items from window 600. For instance, in window 710 are displayed the line items with throughput data.

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The process quantity and usage for each activity and resource combination may default from the operations. Changes may be permitted to accommodate throughput variability due to material viscosity for example. Process quantity, usage information and resource combination are displayed according to the line item structure.

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A user may configure a recipe so that it describes the operation steps involved in a production process, allocates resources and materials to the process. The link of materials to recipe operation steps is not mandatory since the recipe model does not require a routing to be used for specifying processing requirements and embodiments of the present invention may authorize step quantities to be manually entered by the operator.

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Nevertheless, this association may be a prerequisite for automatic step quantity calculation and material consumption management at step level in production execution (Process Operation Control).

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Figure 8 depicts a material and recipe operation window 800, according to an embodiment of the present invention. Material and recipe operation step association window 800 may be accessible from the Recipe Maintenance forms (600, 700) via selecting button 630.

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Material and recipe operation window 800 is used to display formula information related to the step that is currently selected in either window 600 or window 700.

- 5           Material and recipe operation window 800 may contain a routing details window 820 that displays detailed information on a routing selected in window 620.

10           The step quantity field 810 in the Routing Details window 820 may be configured to only display if embodiments of the present invention have been setup to manually maintain step quantities. If embodiments of the present invention have been setup to automatically calculate step quantities, the step quantity field may be hidden.

15           Upon entry to material and recipe operation window 800, the Routing Details window 820 may be automatically populated. If the window is in creation mode, the Formula Details window (1600 in Figure 16) may be populated with the formula details. Otherwise, the step/material association data may be retrieved from the database.

- 20           If a particular ingredient is used by different operations, the user may have the ability to create new formula lines for this ingredient in order to associate them to the appropriate operation steps. In doing so, embodiments of the present invention may check that the overall quantity of ingredients has not changed to ensure that the total composition by item has not been modified for the formula. If so,
- 25           embodiments of the present invention may not allow the recipe to be saved, and may issue an error message substantially similar to "The ratio of items in the formula cannot be altered".

The formula redistribution process may be subject to change management.

Still referring to Figure 800, material and recipe operation window 800 may include materials input window 830. Materials input window 830 may be displayed in response to the selection of input tab 840a. Materials input window 830 may display and allow a user to edit details of the ingredients used as inputs to the selected routing operation.

Material and recipe operation window 800 may further include an output tab 840b. When output tab 840b is selected, a materials output window (not shown) may display and allow a user to edit details of the ingredients produced as outputs from the selected routing operation.

The material quantity calculation may determine how much material is to be processed by each routing step, taking into consideration the routing step dependencies and the materials (input/output) associated to each step. Subsequently, this may be used to establish the number of charges required to satisfy the demand based on the maximum capacity of the selected process element (resource, activity or operation step). If the quantity of a material is changed, embodiments of the present invention may recalculate all dependent quantities in the recipe.

An option may be available at routing level to indicate whether step quantities are manually maintained or automatically calculated by the system. The prerequisites of step quantity calculation are the creation of step dependencies and the association of material to each appropriate step.